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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/037,475	01/03/2002	Hiroyuki Uwazumi	M1971-109	5199
7278	7590	10/07/2003	EXAMINER	
DARBY & DARBY P.C.			FALASCO, LOUIS V	
P. O. BOX 5257			ART UNIT	
NEW YORK, NY 10150-5257			PAPER NUMBER	
			1773	

DATE MAILED: 10/07/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/037,475

Applicant(s)

UWAZUMI ET AL.

Examiner

Louis Falasco

Art Unit

1773

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) 5-8 and 14-17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 9-13 and 18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 1.5.
- 4) ☒ Interview Summary (PTO-413) Paper No(s). 9.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

Claims

The claims are 1 to 18.

Restriction of Invention

1. Restriction to one of the following inventions was required under 35 U.S.C. 121:

Group I. Claims 1 to 4, 9 to 13 and 18 drawn to a magnetic recording medium, classified in class 428, subclass 692.

Group II. Claims 5 to 8 and 14 to 17, drawn to a method of coating, classified in class 427, subclass 127.

Applicant's election without traverse of **Group I** claims 1 to 4, 9 to 13 and 18 in Paper No. 8, received 7/9/03 is acknowledged.

Claims under consideration

The claims under consideration are 1 to 4, 9 to 13 and 18.

Objections

1. The disclosure is objected to because of the following informalities: The Japanese document H8-25542 on page 1 ln 16 is in error. The "H" should be "0".

Appropriate correction is required.

Statutory Basis

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Rejections

1. Claims 1, 9, 10 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted state of the prior art or **Murayama et al** (US 5679473), either one taken with **Futamoto et al** (US 6403203) and either of **Guha et al** (US 6146735) or **Chen et al** (US 5846648)

Admittedly (as in the instant application on page 2 lines 1-9) or as taught by **Murayama et al** (see copy submitted by applicants - Fig 1 and 4 and example 1) magnetic recording medium having a non-ferric oxide underlayer in which magnetic grains are segregated by a non-magnetic oxide have been known in the art. Neither the **admissions** nor **Murayama et al** show a first and second non-magnetic metallic intermediate layer - the first non-magnetic metallic intermediate layer composed of an **oxide** of any of **Re, Ru, Os** and the second a **CoCr** alloy and any of **Nb, Mo, Ru, Rh, Pd, Ta, W, Re, Os, Ir** or **Pt**.

However **Futamoto et al** teaches the convention of having a pair, first and second, of intermediate layers in a magnetic recording medium for promoting epitaxial grain growth.

In **Futamoto et al** see Fig 2 -the intermediate layers 12 and 23 / Fig 8 - intermediate layers 12 and 73 and *also* note the convention of a protective layer - layer 15.

- In **Futamoto et al** see the layer corresponding to applicants' second intermediate layer which is called the "first perpendicular layer" in **Futamoto et al** - a layer of **CoCr** with **Pt** (*cf* Table 1 compositions of this layer in **Futamoto et al**) and

Though in **Futamoto et al** the layer corresponding to applicants' first intermediate layer must be a material differing from the first perpendicular layer is *not* specified as oxide of **Ru** - (noting col. 17 lns 47 - 52 of **Futamoto et al**).

Though **Ru** oxide isn't specified in **Futamoto et al** a layer of **Ru** oxide well known in the magnetic recording art, as demonstrated by **Guha et al** (col. 5 ln 25, col. 8 lns 59-64) or **Chen et al** (col. 11 lns 59,60), as an intermediate layer for separated or isolated magnetic grains.

Guha et al and **Chen et al** show the oxide of **Ru** is a position adjacent the magnetic layer; both **Guha et al** and **Chen et al**, like primary references are directed to magnetic recording medium and they teach the placement of the oxides of **Ru** in an intermediate layer as the first intermediate layer.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to adopt the **Futamoto et al** convention of having a first & second non-magnetic metallic intermediate layers, having the **CoCr** with **Pt**, and adopt the **Guha et al** and **Chen et al** practice of an intermediate layer adjacent the support of **Ru oxide**.

One skilled in the art would have been motivated to adopt the **Futamoto et al** non-magnetic metallic intermediate layers in the **admissions** or **Murayama et al** for suppressing magnetic mutual reaction between magnetic grains (**Futamoto et al** col. 3 lns 19-21) and increasing control over epitaxial growth or the crystallization of the magnetic layer (**Futamoto et al** col. 3 lns 15,16; col. 6 lns 39,40; col. 8 lns 10,11 and 65, 66; col. 9 lns 3 and 4) and select **Ru** oxide as taught in either **Guha et al** or **Chen et al**

adjacent the support to improve grains dispersion (see **Guha et al** col. 4 lns 29, 30 where uniform, isolated dispersions of magnetic oxides are promoted or see **Chen et al** col. 4 lns 29, 30 improving magnetic oxide grain isolation in the magnetic recoding layer).

2. Claims 2 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted state of the prior art or **Murayama et al** either, taken with **Futamato et al** and **Guha et al** or **Chen et al** as applied to claims 1, 9, 10 and 18 above, and further in view of either **Xiong et al** (US 5989673) or **Hedgcoth** (US 5626970).

The primary references do not show a polycarbonate substrate. However polycarbonate substrates are conventional substrate in the art as evident from **Xiong et al** or **Hedgcoth**.

In **Xiong et al** see Fig. 6 non-metallic substrate and col. 2 ln 10 or see **Hedgcoth** see Fig. 3 layer 50 col. 5 lns 6.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to adopt the **Xiong et al** or **Hedgcoth** convention of a polycarbonate substrate in the primary references medium for the purpose of providing a smooth substrate surface.

One skilled in the art would have been motivated to adopt the **Xiong et al** or **Hedgcoth** convention of having a polycarbonate substrate for increasing smoothness of the substrate surface and improved layer adhesion characteristics (see **Xiong et al** col. 1 lns 30-45 and **Hedgcoth** col. 1 lns 49-51).

3. Claims 3, 4, 12 and 13 rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted state of the prior art or **Murayama et al** either, taken with **Futamato**

et al and either **Guha et al** or **Chen et al** as applied to claims 1, 9, 10 and 18 above, and further in view of **Bertero et al** (US 6150015) or **Acharya et al** (US 6610424).

The primary references do not show the chromium / chromium alloy having a (200) lattice plane and a (211) lattice plane in the under-layer. However a (200) and (211) lattice plane for the chromium / chromium alloy the under-layer is conventional as evident from the teachings of either **Bertero et al** or **Acharya et al**.

In **Bertero et al** see Table 1 or **Acharya et al** see col. 3 lns 5,6.

As to the instant demonstration that the hexagonal close packed and a misfit level between lattice constants of unit cells of said second intermediate layer and unit cells and the production of favorable Signal-to-Noise ratios and resultant high Hc shown in instant Tables 1 and 2: either of **Bertero et al** or **Acharya et al** show the advantages of decreasing the non-linear distortion of the underlayer - **Bertero et al** col. 3 ln 12, 27, 28 and col. 13 ln 48 or **Acharya et al** col. 3 ln 8 and cf **Futamoto et al** col. 2 ln 42 showing the hexagonal close packed structure.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to adopt the **Bertero et al** or **Acharya et al** convention of having a (200) and (211) lattice plane in the underlayer in the primary references for the purpose of providing a low noise high output magnetic media (**Bertero et al** col. 2 ln 5, 11 or **Acharya et al** col. 2 ln 38).

One skilled in the art would have been motivated to adopt the **Bertero et al** or **Acharya et al** (200) lattice plane and (211) lattice plane for improving the output of the media while lowering the Signal-to-Noise level.

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Allowable Subject Matter

Allowable subject matter exists in part in claims 3 and 12 because of the inclusion of the hexagonal close packed crystalline structure of the second intermediate layer and the hexagonal close packed crystal structure of the ferromagnetic grains in the magnetic layer and the specific limitation of a misfit between lattice constants of unit cells of the intermediate layer and that of the ferromagnetic grains within + 03 percent.

Evidence in instant Table 1 and Table 2 show that misfit values of lattice constants of about + 03 percent and the a hexagonal close packed crystalline structure of the second intermediate layer and the hexagonal close packed crystal structure of the ferromagnetic grains attain unexpected results of a Hc greater than 3000 Oe and a SNR of more than 20 dB for improved very high density recording. However there is no evidence of this for the -03% as presently included in claims 3 and 12.

Other References

Yusu et al (US 6596419) is cited as being of interest showing the convention of having a separated magnetic grains.

Kirino et al (US 6472047) is cited as being of interest showing the oxide surrounding magnetic grains.

Carey et al (US 6280813) is cited as being of interest teaching a **Ru** layer under the magnetic layer - in Fig. 3 see the "**Ru**" layer.

Suzuki et al (US 5665478) is cited as being of interest showing the oxide of **Ru** positioned adjacent the magnetic layer.

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Kikitsu et al (US 6602620) is cited as being of interest showing magnetic particles in non-magnetic matrix.

INFORMATION DISCLOSURE STATEMENT

Only Murayama et al has been considered – no Foreign Document (i.e., the cited IA Document) has been received and the two Magnetics Society of Japan documents have not been received.

CONCLUSION

The claims under consideration are 1 to 4, 9 to 13 and 18.

- Restriction has been required.
- No claim has been allowed.
- Information Disclosure Statement has been received.

INQUIRES

Any inquiry concerning this communication from the examiner should be directed to examiner Louis Falasco, Ph.D. whose telephone number is 703.305-6974. The examiner can normally be reached M-F 9:30 AM – 6:00 PM.

- If attempts to reach the examiner are unsuccessful, the examiner's supervisor, Paul Thibodeau may be reached at 703.308-2367.
- The Fax phone numbers for the organization where this application or proceeding is assigned are: 703.872-9310 for regular communications and 703.872-9311 for After Final communications.
- An inquiry of a general nature or relating to status of this application or proceeding should be directed to the TC 1700 receptionist whose telephone number is 703.308-0651.


LF
9/03


STEVAN A. RESAN
PRIMARY EXAMINER